Chapter 2

**The northern oriole is a Neotropical migrant that makes use of refuge habitat.**

*USFWS photo*

# Management Direction

- Management Focus
- Refuge Goals, Objectives, & Strategies
- General Refuge Management

## Management Focus

Our management focus is to protect, restore, and enhance habitat for forest and shrub-dependent neotropical and temperate migratory birds, while promoting compatible wildlife-dependent recreational opportunities in support of these efforts.

The lower Delmarva Peninsula is hemispherically important to migrating songbirds. The narrowing peninsula concentrates millions of southward migrating birds into this small area. Adequate cover and food along the migratory route are essential for the long-term viability of these species. Unfortunately, wildlife habitat on the peninsula is becoming fragmented with increased waterfront development and clearing of forest and shrub habitat, threatening the migration corridor. Virginia, Maryland, Delaware and New Jersey have experienced up to 60 percent declines in neotropical songbird numbers in recent history (Mabey et al., 1993). In light of these population declines and habitat losses, increased emphasis is needed to protect, restore, and enhance the lower Delmarva's critically located habitats with a focus on conserving hardwood forests and fruit producing shrubs for these avian migrants.

## Refuge Goals

Goals were developed for the Eastern Shore of Virginia and Fisherman Island refuges after reviewing applicable laws, policies, regional plans, the refuge vision statement, the purpose of each refuge, the Refuge System mission, and public comments.

**Yellow-rumped warbler.**
*USFWS photo*

Refuge goals are broad, descriptive statements of purpose. They highlight specific elements of our vision statement and provide the foundation for our management emphasis. They further the refuges' focus on protecting, restoring, and enhancing habitat for forest and shrub-dependent neotropical and temperate migratory birds, while promoting compatible wildlife-dependent recreational opportunities in support of these efforts. The goals are not presented in order of priority.

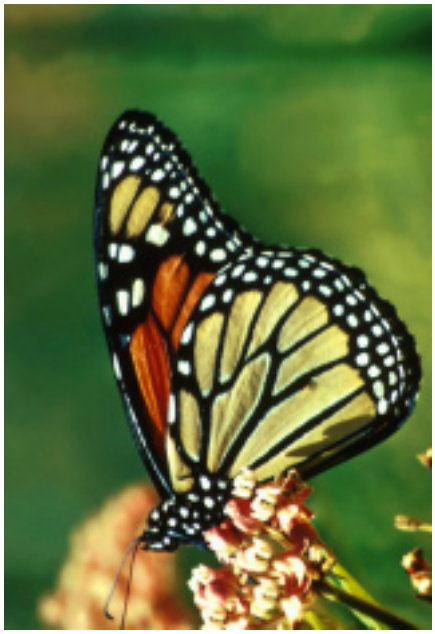
Each goal is further refined by a series of objective statements. Objectives are incremental steps to be taken toward achieving a goal and define the management emphasis in measurable terms where possible. The strategies for each objective are specific actions, tools, techniques, considerations, or a combination of these, which may be used to achieve the objective. Strategies may be revised or modified to achieve the desired outcome.

Together, the goals and objectives are unifying elements of successful refuge management. They identify and focus management priorites, provide a context for resolving issues, and offer a critical link between refuge purposes and the National Wildlife Refuge System mission. The following goals, objectives, and strategies provide management direction for the refuges over

the next 15 years. (Strategies are listed in five-year increments following the plan's approval)

## GOAL 1: Increase the availability of forage and cover habitat for neotropical and temperate migrant birds and migrating monarch butterflies.

### Objective A: Hardwood-Dominated Forest



**Monarch butterfly.**
*USFWS photo*

To provide additional sources of high-quality forage for neotropical and temperate migrants, increase the amount of contiguous hardwood habitat (oaks, hickory, maples, and sweet gum) on the Eastern Shore of Virginia Refuge by converting existing open grassland habitat adjacent to forested stands.

*Rationale for the Objective:* Hardwood-dominated forests have a high food value for neotropical and temperate migratory birds because of the diverse understory associated with these habitats (Watts and Mabey 1994). Map 2-1 (page 2-8) depicts hardwood management units.

**Strategies:**

*1-5 years*

1. Determine appropriate hardwood management techniques including the number and variety of trees to be planted, planting location and schedule, and evaluation of deer impacts. Include proposed techniques in the habitat management plan.
2. Establish 10 x 10-meter plots to test treatment regimes for eliminating Japanese honeysuckle and kudzu encroaching on existing hardwood stands.
3. Plant two acres of mixed hardwoods in MU 6 to be specified in the habitat management plan (may include deer exclosure fencing).

*6-10 years*

4. Plant 15 acres of mixed hardwoods in MU 8 to be specified in the habitat management plan.
5. Convert two acres of grassland to mixed hardwoods and shrubs in the refuge housing area (areas between individual houses) through natural succession and plantings.
6. Develop an agreement with the Chesapeake Bay Bridge Tunnel (Bridge-Tunnel) Authority and Sunset Beach Resort to plant hardwoods on their property in areas contiguous to forested stands.

*11-15 years*

7. Plant 10 acres of mixed hardwoods within the old railroad right-of-way as specified in the habitat management plan.

### Objective B: Forest Understory

Increase the density and abundance of the forest understory in closed canopy pine stands (i.e., stands 20–80 years old) to provide forage for frugivorous and insectivorous neotropical and temperate migrants.

*Rationale for the Objective:* Establishing native shrubs and vines in forest openings increases fruit and insect abundance, thereby benefitting migratory birds (Blake and Hoppes 1986). We will create an experimental plot to determine the specific management practices necessary to create optimum fruit and insect abundance for birds throughout the migration and winter seasons.

#### Strategies:

*1-5 years*

1. Continue to conduct an annual deer hunt on Eastern Shore of Virginia Refuge to minimize the effects of deer browse on the understory.
2. Thin loblolly pine on Wise Point. To thin, we will use a chain saw on a 0.25-acre test plot within the 30 acres of forest at Wise Point. Only small sections will be thinned as the majority of the existing pines on Wise Point are of low vigor and will not respond to thinning and are likely to succumb to salt intrusion, sensescence, and pine beetle infestation (Mallett 2001). Subsequent adjustments to thinning will be based on test plot results.
3. Leave standing dead trees (>15.2 cm diameter-breast-height, or dbh) within the 30-acre forest at Wise Point to increase the availability of forage (insects) for avian migrants (e.g., black-and-white warblers, ruby-crowned kinglets). In addition, snags will fulfill avian cavity nest site size requirements of species occurring on the refuge.
4. Develop a 15-year monitoring plan that outlines protocols for monitoring fruit production of forbs (pokeweed), shrubs and saplings (black cherry, viburnum), and vines (greenbrier, Virginia creeper, poison ivy). The monitoring plan will outline pre- and post-management monitoring to measure understory response to thinning.
5. Monitor the effects of deer on browse species and forage availability for neotropical migrants through the use of exclosures and control plots on both refuges.
6. Burn about 35 acres of loblolly pine stands at Wise Point to encourage a productive understory and kill pine seedlings.

*6-10 years*

7. Manage loblolly pine stands that are approaching closed canopy conditions by removing trees as indicated above under Strategies 3–5.
8. Continue monitoring for fruit production and understory response to thinning. Based on monitoring results, manage stands where the canopy becomes closed.

**Loblolly pine.**
*Charles Philip*

*11-15 years*

9. Continue monitoring understory growth. Based on monitoring results, manage stands where the canopy becomes closed.

### Objective C: Upland Shrub

Maintain and increase native shrub-dominated cover (e.g., bayberry, chokeberry, sumac, viburnum) and nectar-producing forbs (e.g., pokeweed, goldenrod) on the existing mid-successional management units (MU 2-6, 6A, 7, 9-11, 14, and Wise Point tip) to increase the availability of feeding and resting habitat for shrub-dependent migratory birds, including raptors, that rely on these resources.

*Rationale for the Objective:* Fruiting shrubs provide a fuel source for numerous fall migratory birds that pass through the lower Delmarva Peninsula during their southern migration. Struthers et al. (2000) observed fall migrants using shrub habitats more than wooded sites; as trees encroached and shaded fruit-bearing shrubs, bird use declined. In addition, because abundant numbers of fall migrating raptors hunt these shrub habitats, such habitats also provide an indirect food source. Increased nectar availability will also benefit migrating monarch butterflies. Map 2-1 (page 2-8) depicts shrub management units.

**Fennel, an invasive plant found on the refuges.**
*Mike Terry*

Strategies:

*1-5 years*

1. Establish experimental plots to control invasive plants (e.g., Japanese honeysuckle, fennel, and kudzu) and evaluate the vegetative response to various treatment methods (e.g., mowing, prescribed burning, application of herbicides) prior to their widespread use. Monitor existing conditions prior to treatment.
2. Remove, using a chain saw or hydroaxe, approximately seven acres of loblolly pine adjacent to and encroaching on wax myrtle shrub habitat on the southern tip of Wise Point.
3. Remove, using a chain saw or hydroaxe, loblolly pine (< 25.4 cm dbh) from MUs 4, 5, 6, 6A, 7, and 10, leaving some scattered pines to provide winter and roosting cover.
4. While cutting loblolly pine in 6A, cut autumn olive shrubs and treat stumps with an approved herbicide to prohibit invasion once the area has been opened.
5. Allow grasslands in MUs 9, 10, and 11 to convert to shrub through natural succession.
6. Monitor the effects of deer on browse species and forage availability for neotropical migrants through the use of exclosures and control plots.
7. Assess breeding use by those Partners in Flight (PIF) priority species (e.g., prairie warbler, field sparrow) using maritime shrub thickets.

**Bayberry.**
*USFWS photo*

*6-10 years*

8. Burn cut areas on Wise Point (Strategy 2) and MUs 4, 5, 6, 6A, 7 and 10 (Strategy 3) to maintain newly created shrub habitats.
9. Monitor fruit production of forbs (pokeweed), saplings and shrubs (black cherry, bayberry, wax myrtle), and vines (greenbrier, Virginia creeper, poison ivy) using the same protocol developed in the fruit monitoring plan for forest understory (Objective B, Strategy 5).
10. Cut Management Units when pines and larger hardwoods (dbh > 15.2 cm [Denmon 1998]) invade. Cut fields in 14-acre rotational blocks (Berdeen and Krementz 1998) so that fruiting shrub habitat is always available. Conduct monitoring on two plots: one in both MU 5 and MU 7 to ascertain senescence and determine cutting schedule.
11. Develop an agreement with the Bridge-Tunnel Authority to manage pines on their property in the Wise Point area that are encroaching on wax myrtle shrub habitat.

*11-15 years*

12. Remove regenerating loblolly pine, using a bushhog or hydroaxe, to facilitate shrub growth in MU 10.
13. Continue to monitor and control invasives and suppress loblolly pine invasion on MUs 2-6, 6A, 7, 9-11, 14, and Wise Point tip.

### Objective D: Grasslands

Establish a large contiguous block (78 acres) of native warm season grasses in MUs 1 and 13 to provide food sources, perches, and escape cover for grassland-dependent temperate and neotropical migratory birds. Vegetative cover will consist of 65–90 percent warm season grasses (e.g., little bluestem, Indian grass), 10–35 percent forbs (e.g., goldenrod, pokeweed), and 10–20 percent scattered native shrubs (e.g., groundsel, bayberry).

*Rationale for the Objective:* Habitat size is a required element of breeding habitat for many grassland bird species (Vickery et al. 1994). While few studies exist, habitat size is also believed essential to migrating and wintering grassland-dependent birds (Watts 2000). Many species of grassland birds are declining throughout their range due to habitat loss (Askins 1993); therefore, the refuge seeks to provide migrating and wintering grassland bird habitat where feasible. Grassland management will only occur where large contiguous grassland habitat can be established on the refuge without depleting existing shrub or forested habitat. Map 2-1 (page 2-8) depicts grassland management units.

#### Strategies:

*1-5 years*

1. Maintain existing grasslands (over the life of the plan) using a variety of techniques including mowing, prescribed burning, and discing.

2. Establish experimental plots in MU 1 to control invasive plants and evaluate the vegetative response to various treatment methods (e.g., mowing, discing, application of herbicides) prior to their widespread use. Monitor existing conditions prior to treatment.
3. Remove hedgerows between MUs 1 and 13 and autumn olive in MU 1.

*6-10 years*

4. Eradicate 20 percent of the existing Japanese honeysuckle population per year over a five-year period based on the results of Strategy 2 using invasive control measures such as mowing and the application of herbicides.
5. Eliminate 10 percent of the existing fennel population per year over a 10-year period using appropriate control techniques (e.g., deep discing, plowing, herbicides) based on the results of Strategy 2.
6. Eliminate the feral cat population on the Eastern Shore of Virginia Refuge. Refuge staff will live trap animals and transfer them to a shelter for adoption. Refuge staff will continue to manage the feral cat population as needed.

*11-15 years*

7. Continue to monitor and control invasives and manage for grasslands on MU 1 and 13.

## GOAL 2: Maintain the long-term productivity, integrity, and function of the marsh, beach, and interdunal communities.

### Objective A: Beach Dynamics

**Beach erosion.**
*USFWS photo*

Maintain the natural dynamics of erosion and accretion of the beach community on Fisherman Island Refuge by allowing these coastal areas to grow and erode with passing storms and water currents.

*Rationale for the Objective:* Fisherman Island is a dymamic mid-Atlantic coastal barrier island. Like many barrier islands, it consists of several dynamic habitats such as beach, dune, and tidally-influenced salt marsh. Accretion has led to significant increases in beach and foredune habitat on the north/northeast and south/southeast portions of the island. There have been similar increases in salt marsh habitat in the northern section of the island. Monitoring these habitats will show us the impacts to breeding productivity including the quality and quantity of available nesting habitat.

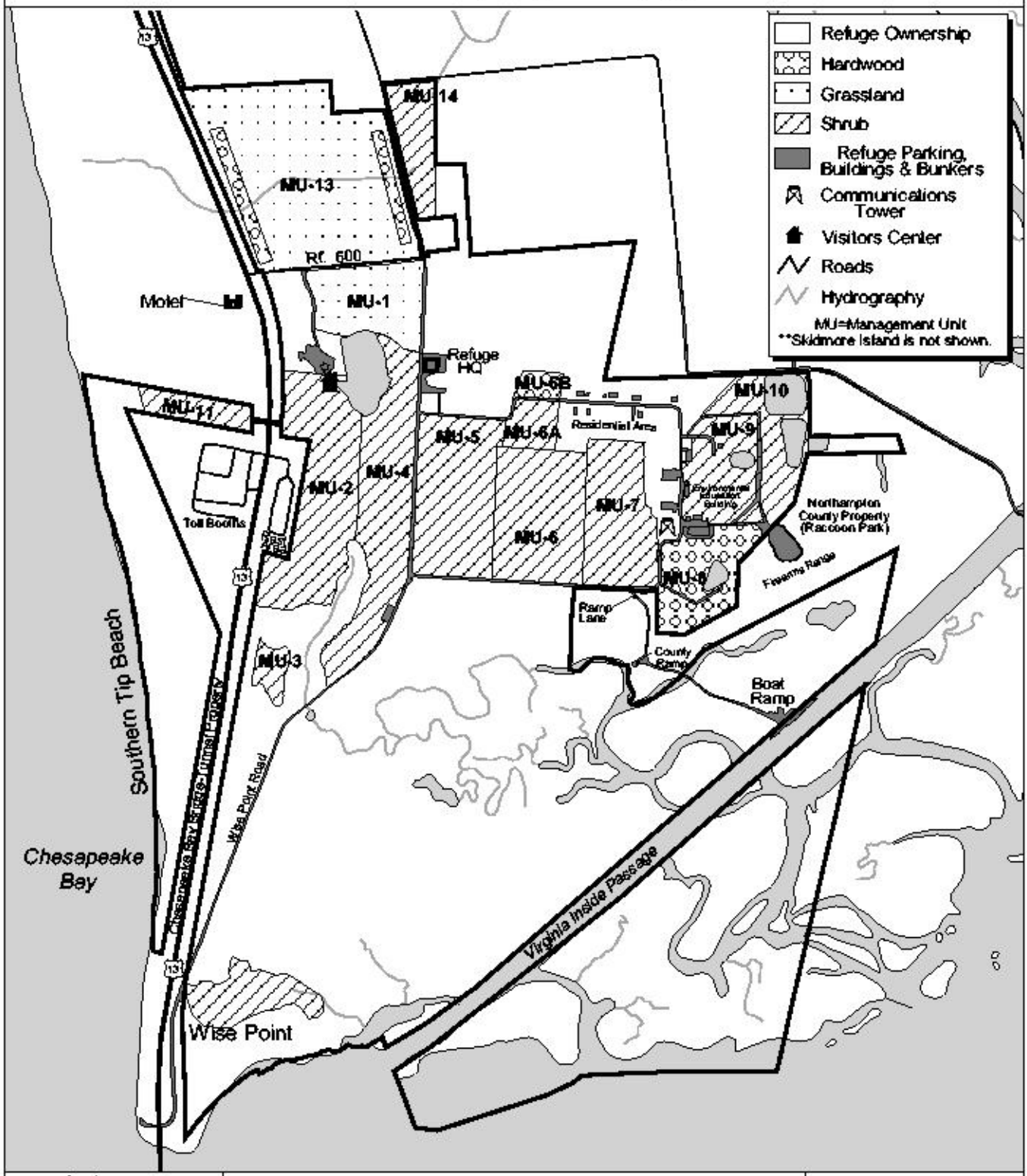
Strategies:

*1-15 years*

1. Monitor changes in island topography using aerial photos and research projects.
2. Monitor sand accretion and erosion on Fisherman Island at

Map 2-1

# Habitat Management
## *Eastern Shore of Virginia Refuge*




Data Sources:
1:24,000 Hydrography & 1:100,000 Road data provided by USGS with source dates of 1981 & 1989. All other data provided by USFWS. Projection/Datum: UTM Zone 18, NAD 27, Meters.
Map prepared for the Eastern Shore of Virginia NWR & Fisherman Island NWR Comprehensive Conservation Plan by the R5 Cartography & Spatial Data Services Section. March 2003
This map is for planning purposes only.

0 1000 2000 3000 4000 Feet

0 300 600 900 1200 Meters

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least every two years using accepted protocols.

3. Evaluate vegetation in royal tern nesting area; investigate the need to remove vegetation to enhance tern nesting habitat and deter nesting gulls.

### Objective B: Beach and Dune Habitats

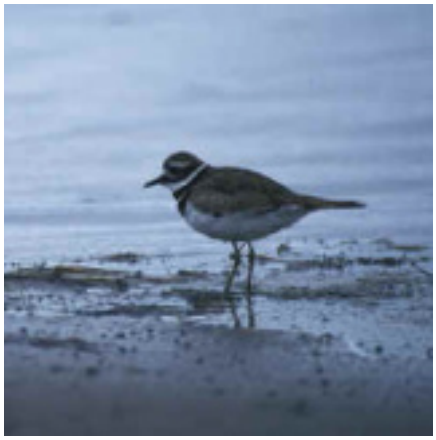
Enhance the quality of nesting (e.g., royal tern, American oystercatcher) and migrating (e.g., sanderling) habitat on Fisherman Island Refuge by minimizing disturbance to beach-dependent birds and other wildlife from humans and predators.

*Rationale for the Objective:* Disturbance can lead to nest abandonment, chick mortality, and predation of nests and chicks during the breeding season (Burger 1991, 1994). Disturbance to staging areas during migration can lead to declines in shorebird abundance (Pfister et al. 1992).

#### Strategies:

*1-15 years*

1. Monitor human disturbance on Fisherman Island Refuge to verify adverse effects on avian nesting productivity and to minimize disturbance.
2. Continue to close Fisherman Island to public use during the nesting season (March 15 through September 30) with the exception of International Migratory Bird Day. Issue Special Use Permits to qualified researchers.
3. Focus interpretive and educational tours on Fisherman Island Refuge along the entrance road and within a quarter of a mile from where the entrance road reaches the beach.
4. Complete weekly avian surveys from Feb. 1 to May 31 to assess when breeding target birds (e.g., American oystercatchers, royal terns) are in the area. Complete bimonthly surveys the remainder of the year.
5. Conduct colonial nesting bird surveys for royal terns, sandwich terns, American oystercatchers, and others.
6. Conduct annual Christmas Bird Count on Fisherman Island.
7. Conduct volunteer beach cleanups on Fisherman Island and Eastern Shore of Virginia Refuges.
8. Update floral survey of Fisherman Island Refuge.
9. Install closure signs on Fisherman Island Refuge to inform boaters that the island is closed to the public. A Sign Plan will contain details of where the signs will be placed and what they will say.
10. Hire a law enforcement officer to educate the public about the sensitive nature of barrier islands and nesting bird colonies and to enforce area closures, particularly during the nesting season.
11. Monitor predator disturbance on Fisherman Island Refuge to determine adverse effects on avian nesting productivity.
12. Continue quarterly predator transect surveys on Fisherman



**Killdeer.**
*USFWS photo*

**Raccoon.**
*USFWS photo*

Island beaches and marshesto monitor mammalian predator activity.

13. Monitor colonial nesting bird sites each nesting season for the presence of mammalian predators, avian losses, and predator/prey relationships.
14. Determine and evaluate productivity for the following species: brown pelican, royal tern, American oystercatcher, laughing gull, herring gull, and great black-backed gull.
15. Implement a zero tolerance policy for red fox, coyote, and feral cats by immediately removing these predators using appropriate humane methods such as padded leg-hold traps and/or lethal means.
16. Implement gull control measures if colonial or beach nesting bird numbers are in decline because of predation by, competition with, or displacement by gulls. We will assess the implementation of non-lethal control methods, such as harrassment, before implementing lethal methods, such as destroying nests/eggs, addling eggs or killing adults.
17. Implement mammalian predator (i.e., raccoon) control measures if colonial or beach nesting bird numbers are in decline because of predation.

### Objective C: Threatened and Endangered Species

Protect and maintain beach habitat on the refuges in an unimpaired condition for Federal-listed species and for other species and habitats of special concern.

*Rationale for objective*: Three listed species—Northeastern beach tiger beetle, piping plover, and seabeach amaranth—either occur or historically have occured on the refuges. When State recovery plans become available, we will use them whenever practical to manage State-listed species found on the refuges.

#### Northeastern Beach Tiger Beetle

The Northeastern beach tiger beetle is a Federal-listed species found on the southern tip beach of the Eastern Shore of Virginia Refuge. It is the only listed species suspected to reside on either of the refuges. The Sunset Beach Resort owns property abutting the southern tip beach. Cooperation with resort owners is necessary for the beetles' protection.

**Strategies:**

*1-5 years*

1. Monitor beach width annually on the southern tip beach to determine the beach habitat available for tiger beetles.
2. Survey adult tiger beetles between the end of June and the beginning of July to determine breeding population status
3. Conduct weekly adult tiger beetle surveys for 3–5 years in the summertime, beginning in June, to look at fluctuations in populations.

4. Assess trespassing (e.g., number of people and type of activity) on the southern tip beach.
5. Coordinate with Sunset Beach Resort to protect the tiger beetle population on the refuge and to educate the public about tiger beetle life history requirements.
6. Install interpretive signs on the southern tip beach to provide information about tiger beetles.

*6-10 years*

7. Using genetic tests, determine which subspecies of Northeastern beach tiger beetle exists on the southern tip beach.
8. Depending on results from adult tiger beetle surveys, conduct tiger beetle larval surveys on the southern tip beach for a minimum of three years to determine if tiger beetles breed on the refuge.

## Piping Plover

**Piping plover.**
*USFWS photo*

The piping plover was last recorded nesting on Fisherman Island in 1992. Reasons for absence of recent nesting activity may include the sparse and declining numbers of breeding birds in this portion of the species' range, sub-optimal (but moderately suitable) habitat, and deterrence of plover courtship activities by roosting herring and great black-backed gulls.

*1-5 years*

9. Conduct semi-weekly (twice a week) surveys of piping plovers during spring migration (approximately March to early May) and fall migration (August to mid-September) to determine the importance of the site for migration.
10. Conduct weekly surveys of breeding plovers in late May, June, and July.
11. Conduct semi-monthly (twice a month) surveys of piping plovers the rest of the year (October–February). Note locations of piping plover with Global Positioning System (GPS) and note micro-habitat characteristics to determine if patterns exist where plovers are observed foraging. Use this to determine and locate the best potential nesting areas. Report sightings of color-banded birds.
12. If plovers are found nesting on Fisherman Island Refuge, maximize potential production by providing intensive protection from predators.

*6-10 years*

13. Use GPS to map locations of nesting American oystercatchers on Fisherman Island Refuge to assist in determining potential sites for breeding piping plovers. (Oystercatchers and plovers use similar habitat.)

### Seabeach Amaranth

Seabeach amaranth was Federally listed as threatened in 1993 by the Service. An annual plant, the amaranth often grows in the same areas selected for nesting by shorebirds. Threats include beach stabilization efforts, intensive recreational use, and herbivory by webworms. The plant has historically occured in Northampton County. More intense surveying is needed to ensure the plant's protection should it become established on Fisherman Island Refuge.

*1-15 years*

14. Survey once a month, in July and August, for seabeach amaranth. Surveying can be completed from a vehicle.
15. If found, establish a 10-foot buffer of engineering tape or other type of obvious barrier around the plant to alert staff and researches of location so it is not damaged.

#### Objective D: Tidally-Influenced Salt Marsh

Monitor and, where possible, preserve the quality and natural function of tidally-influenced salt marsh on the refuges for marsh-dependent birds (e.g., clapper rail, seaside sparrow) and other avian species.

**Seaside sparrow.**
*USFWS photo*

*Rationale for the Objective:* Marsh and wading birds include species of regional and national management concern. Baseline data on the status of marsh and wading birds are needed for both refuges, including Skidmore Island. Data will be used to determine species presence, abundance, and distribution, and will aid in monitoring temporal impacts of salt marsh habitat changes (i.e., rise in sea level).

Strategies:

*1-5 years*

1. Continue annual marsh breeding bird callback surveys according to Service protocol to assess use of salt marsh habitat by breeding birds.
2. Conduct an annual breeding bird survey of the heron rookeries.
3. Continue to conduct and expand regional marsh bird surveys.
4. Determine the extent of the phragmites invasion on both refuges through aerial photos and ground investigations.
5. Conduct baseline studies in the vicinity of the boat ramp related to marsh-dependent species, water quality, and habitats to monitor impacts of boat ramp.

*6-15 years:*

6. Control phragmites according to the Invasive Species Management Plan. This may include the use of herbicides in late summer and prescribed burning in late fall/early winter.

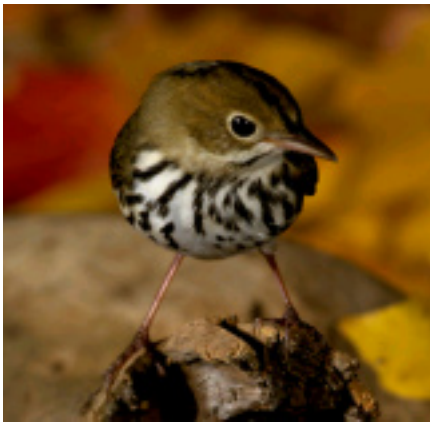
7. Continue surveys in Strategies 1–5.

## Goal 3: Actively participate in the conservation of healthy hardwood, understory, and grassland habitat for neotropical and temperate migratory birds during future development throughout Northampton County.

### Objective A: Protect Existing Forest/Shrub Migratory Bird Stopover Habitat

Maintain unprotected forest and shrub habitat within the lower 10 km of the Delmarva Peninsula to reduce the rate of loss of stopover habitat for neotropical and temperate migrants.

*Rationale for the Objective:* Because of its geographic configuration, the lower Delmarva Peninsula provides important stopover habitat for large concentrations of migrant land birds. Studies have identified the highest priority lands as those within the southernmost 10-km of the peninsula, within a 1.5-km wide zone (10k zone) bordering bayside and seaside coastlines (Mabey et al. 1993, Watts and Mabey 1994). Due to this concentration effect and to rapidly increasing development pressures, protection or restoration of migration habitat of any size or configuration at the southern tip of the peninsula is critical. See the Land Protection Plan (Appendix E) for more details.



**The ovenbird is one of numerous Neotropical songbirds that utilizes refuge resources.**
*USFWS photo*

Strategies:

*1-5 years*

1. Continue to work with willing landowners to acquire lands within our 310-acre previously approved acquisition boundary.
2. Protect additional existing forest and shrub habitat through purchase of fee title or conservation easements within the 10k zone (see Appendix E). Lands will be acquired from willing sellers within the 6,030-acre expansion area (which includes the 310 acres described above). This area includes approximately 1,800 acres of forested habitat important to migrants. The area extends from the tip of the peninsula north along the bay to Plantation Creek and north along the seaside to Walls Landing Creek, and is bounded by Routes 600 on the east and 645 on the west. Much of the remaining forest occurs in low, wet riparian areas along creek drainages or on hydric soils too wet to farm, and is surrounded by farmland.
3. At the time of new acquisitions, the refuge manager will evaluate existing public uses and determine whether they are compatible. If no public uses have been established, new tracts will remain closed to public use until a formal compatibility determination has been completed.
4. Work with local realtors to monitor the availability of high-priority lands for purchase.
5. Coordinate Geographic Information System (GIS) analysis of the lower Eastern Shore with Northampton County

officials, The Nature Conservancy (TNC), State, and Service partners to further support cooperative land protection efforts on the lower Delmarva Peninsula.

6. Assist State, County, and private partners in obtaining grants to protect high-priority lands through a variety of land protection strategies (e.g., direct purchase, conservation easements).
7. Coordinate with the Northampton County Planning Commission, Accomack-Northampton Planning District Commission, and others to identify private lands within the County that are suitable for conservation easements.

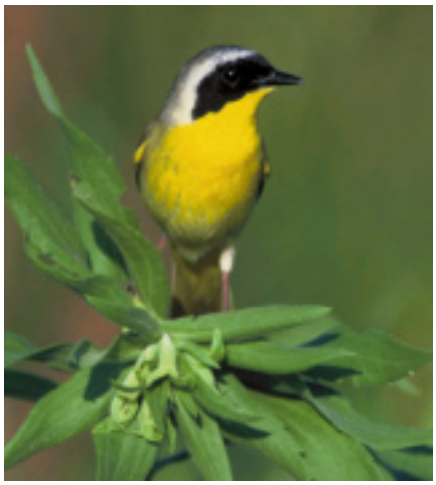
*6-10 years*

8. Coordinate with partners to develop a training course on conservation easements for Refuge, State, and County employees.
9. Encourage and support the development of a land trust by local citizens to protect high-priority wildlife habitat in Northampton County.

### Objective B: Acquire and Restore Agricultural Lands to Forest/Shrub Migratory Bird Stopover Habitat

Acquire and restore agricultural lands to hardwood forest and shrub migration habitat in the lower 10-km of the Delmarva Peninsula to increase the availability of high-quality staging and stopover habitat for neotropical and temperate migrants. Consider native grassland restoration where large, contiguous tracts of this habitat type could be effectively managed over time.

*Rationale for the Objective:* Protecting more land on the Eastern Shore of Virginia will provide more wildlife habitat for a variety of species. The lower Delmarva Penisula provides important stopover habitat for large concentrations of migrant land birds. Studies have identified the highest priority lands, which are reflected in ower LPP. Due to this concentration effect and to rapidly increasing development pressures, protection or restoration of migration habitat of any size or configuration at the southern tip of the peninsula is critical.



**Common yellowthroat, a Neotropical migrant.**
*USFWS photo*

Strategies:

*1-5 years*

1. Acquire and restore agricultural lands within the 6,030-acre expansion area (Appendix E) to hardwood forest and shrub habitat to widen/reconnect the vegetated migration corridor where possible. The project area includes approximately 3,315 acres of agricultural land, or about 55 percent of the total land area proposed for acquisition. Land will be acquired from willing sellers, as funding allows.
2. Work through our Partners for Wildlife Program and with other partners, such as the Natural Resources Conservation Service, to establish conservation easements

on agricultural lands not protected through acquisition within and outside the 6,030-acre expansion area. Focus particularly on restoration of vegetated riparian buffers along creek drainages and on marginal agricultural soils.

## Goal 4: Provide wildlife–dependent recreational opportunities and community outreach with an emphasis on educating the public about the critical role the Delmarva Peninsula serves for neotropical and temperate migratory birds and migrating monarch butterflies.

### Objective A: Hunting Opportunities

Offer safe, high-quality opportunities for archery and shotgun deer hunting on existing or new refuge lands to provide wildlife-dependent recreational opportunities and to enhance the quality of the understory for neotropical and temperate migrants.

**Bow hunter.**
*USFWS photo*

*Rationale for the Objective:* Hunting is identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use. Providing wildlife-dependent recreational opportunities like hunting helps foster an appreciation for wildlife. Also, studies have shown that an overabundance of deer can have a significant detrimental effect on the forest understory. Such habitat is of particular importance to neotropical and temperate migratory birds. A deer hunting program will help prevent serious habitat degradation of the forest understory.

Strategies:

*1-5 years*

1. Provide an annual deer hunt program for archery and shotgun in designated zones (see Map 2-2, page 2-23) of the Eastern Shore of Virginia Refuge during specific days of the fall and winter (23 hunters per day, 19 days total).
2. Promote hunting on the Eastern Shore of Virginia through participation in the annual National Hunting and Fishing Day.
3. Work with State and Federal partners to determine if the number of hunters per refuge hunt zone is within safe limits given the proximity of the hunt to refuge housing and public roads.
4. Work with State partners to modify the hunt program at Eastern Shore of Virginia Refuge to increase the take of deer. Evaluate season length, method, number of hunters and their distribution.
5. Work with State partners to assess the health of the deer population on Fisherman Island Refuge.
6. Open a portion of the former Wise Point Corporation property to deer hunting.
7. Provide waterfowl hunting opportunities by boat on a portion of the former Wise Point Corporation property. Waterfowl

hunt season dates and bag limits will fall within the parameters of the State's waterfowl season and will be administered in a way that will cause the least amount of disturbance to neotropical migratory birds. This may mean starting the season later, which may also mitigate conflicts between waterfowl hunting and other wildlife-dependent recreational activities.

*6-10 years*

8. Open a portion of Fisherman Island Refuge to an archery deer management hunt. A management hunt means that the hunt is conducted for biological reasons, such as when monitoring shows a significant decline in habitat quality due to over-browsing. Therefore it may not be conducted every year.
9. Allow deer and small game hunting on lands to be acquired, provided it will cause minimal disturbance to neotropical migratory species. Hunting will fall within the parameters of the State hunting seasons, and will be administered so as to minimize disturbance to neotropical migrants. Deer hunting will start after December 1. Hunting will be allowed only on forested tracts measuring 75 acres or more in size. No pursuit dogs will be allowed.
10. Allow waterfowl hunting on marsh blocks to be acquired that are 200 acres or larger. Most waterfowl hunting will occur on seaside marsh areas acquired. Waterfowl hunting on new lands will be subject to the conditions mentioned in Strategy 7 above.

### Objective B: Boating and Fishing Access

Accommodate the needs of commercial watermen and recreational anglers and boaters by providing deep water access to fishing and hunting grounds on the Atlantic Ocean and Chesapeake Bay.

**Wise Point Boat Ramp 2002.**
*USFWS photo*

*Rationale for the Objective*: The Wise Point boat ramp is located on the deep waters of the Virginia Inside Passage which was constructed in the 1950's and bisects the refuge. Despite miles of shoreline in Northampton County, public deep water access is very limited. There are six public boat access points in the county (not including Wise Point), with the closest ramp on the Atlantic Ocean located 10 miles north (Oyster). The closest public ramp on the Chesapeake Bay is 3.5 miles away (Kiptopeke State Park). Both of these ramps are used beyond capacity during certain summer days and other popular fishing times. Additionally, the Wise Point site is ideal because of its proximity to the Chesapeake Bay Bridge Tunnel, a popular fishing location. The ramp location also affords a relatively safe harbor because of the islands and marshes to the east which provide protection to boaters during storms and high winds.

There was limited use of the boat ramp by recreational and commercial users before the area became part of the refuge.

**Black–crowned night–heron**
*USFWS photo*

Because of both the demand for boat launching in the County and the limited supply of suitable sites, there is an expectation that this site will be available to the public. Additionally, there were 21 commercial watermen paying for and using this site on a commercial basis when the area became refuge land. Many of these commercial watermen have Commonwealth-leased grounds and permits for locations in close proximity to the Wise Point ramp. These watermen have a vested interest in gaining access that is proximate to their established work sites.

Northampton County, which has little revenue from industrial and manufacturing businesses, is trying to balance the desire to maintain its rural atmosphere with its fiscal needs. The Wise Point boat ramp will bring dollars to the County through ecotourism, use by recreational boaters, and through commercial watermen in the form of job opportunities, taxation on commercial catch, and purchase of fuel, food, and lodging.

Strategies:

*1-5 years*

1. Conduct baseline studies in the vicinity of the boat ramp related to marsh-dependent species, water quality, and habitats.
2. Secure a right-of-way agreement with Northampton County for passage through Raccoon Park.
3. Improve and widen the entrance road and improve and enlarge the parking lot. Cap parking at 75 spaces, reserving 12 spaces for commercial watermen.
4. Construct a two-lane boat ramp, commercial dock, and a commercial off-loading site. Provide support facilities such as restrooms, lighting, an electric gate, signage, and overflow/satellite parking if needed to reach 75 parking spaces.
5. Minimize impact to permitted commercial watermen by allowing access during construction as much as possible.
6. Once improvements are made, open the ramp daily to recreational anglers and boaters and commercial watermen during normal refuge hours (half an hour before sunrise to half an hour after sunset) with extended hours during certain seasons. Open the ramp for 24-hour access to a limited number of permitted commercial watermen that were using the area on a commercial basis and paying a commercial rate at the time of Service purchase (Dec. 26, 2001). The refuge may be closed at certain times (e.g., during a gun hunt or prescribed burning), impacting access to the boat ramp at those times.
7. Charge $10 for recreational day-use permits and $120 for an annual recreational pass (rates will change with inflation). Users that were commercially using the area and paying a commercial rate when the Service purchased the site will pay an annual fee of $1,500 for those who dock their boats and $600 for those who do not dock their boats (no new docking privileges will be granted). New commercial users

and commercial users that were not paying a commercial fee when the Service purchased the property will be allowed to use the site commercially and will be charged $400 annually. These new commercial users will not be granted use of the docks, reserved parking, nor 24-hour, 7 days-a-week access. However, they will be allowed to use the off-loading area for commercial catch.

8. Boat docking will be phased out over time. Once the commercial watermen (those that met certain criteria when the land was purchased) retire or terminate commercial fishing from this site, their docking rights will be relinquished. However, their other special rights (24-hour access, reserved parking) may be passed on to one heir who is a named individual (not a business) and is actively participating in commercial fisheries from the site. All special rights terminate after the second generation.
9. If annual, commercial special use permit fees are not paid according to permit schedule, and/or if the special use permittee violates any permit conditions, then permit priviledges will be permanently revoked.
10. Cap the number of canoes and kayaks to two per vehicle; any vehicle with more than two kayaks must obtain a Special Use Permit.
11. After improvements are completed, contract with a concessionaire to manage the site. If no concessionaire is found, manage the site through the refuge fee program.
12. Do not allow pets in the boat ramp area.
13. Do not allow personal watercrafts (PWCs) to launch from the boat ramp.
14. Partner with the State to extend the no-wake zone in the Virginia Inside Passage, adjacent to the refuge.
15. Provide opportunities for shoreline and other fishing on newly acquired lands, provided that such opportunities would not harm or harass tiger beetle populations.

**Refuges are home to beautiful birds to photograph, such as this snowy egret.**
*USFWS photo*

### Objective C: Wildlife Observation and Photography

Expand opportunities on the Eastern Shore of Virginia Refuge and maintain those existing on Fisherman Island Refuge, for visitors to engage on wildlife viewing and nature photography along trails and existing roads.

*Rationale for the Objective:* Wildlife observation and photography are identified in the National Wildlife Refuge System Improvement Act of 1997 as priority public uses. Providing increase opportunities for the public to participate in these activities on the refuge promotes visitor appreciation and support for refuge programs as well as habitat conservation efforts on the southern tip of the Delmarva Peninsula.

**Photo blind located on entrance road where birds and other wildlife may be observed.**
*USFWS photo*

Strategies:

*1-5 years*

1. Continue to offer only guided tours of Fisherman Island Refuge on weekends from October 1 through March 15.
2. Maintain the photo blind on Eastern Shore of Virginia Refuge.
3. Continue to provide an observation window in the Visitor Center overlooking a freshwater pond. Annually remove invasive cattail in the pond to enhance viewing from the observation window.
4. Maintain two overlooks along 1.5 miles of trails on the Eastern Shore of Virginia Refuge.
5. Maintain the butterfly garden adjacent to the Visitor Center with native nectar-producing shrubs and forbs to provide food sources for butterflies and wildlife observation opportunities for visitors.
6. Construct 0.6 mile trail which will allow additional public, pedestrian access for wildlife observation and photography. The new trail will run along the Wise Point Road and then extend to the salt marsh, where we will construct a 200-foot boardwalk, an overlook, and an associated interpretive panel. There will be limited access (i.e., tours) to the trail during fall migration to curb disturbance to migratory species.
7. Establish a 0.2-acre butterfly garden at the refuge office and initiate a volunteer "Adopt-a-Garden" program to ensure that refuge butterfly gardens are maintained.
8. Conduct weekly butterfly walks in October to educate visitors about the monarch migration.
9. Establish links on photography websites to promote the refuge as a good place to view and photograph wildlife, particularly neotropical and temperate migratory birds during the fall migration.

*6-10 years*

10. Conduct an annual photography workshop incorporating both classroom and field activities that focuses on refuge wildlife, particularly neotropical and temperate migrants.
11. Promote wildlife viewing and photography on the refuge website by posting a series of new photographs and species information monthly.
12. Establish a 0.2-acre butterfly garden at the wildlife trail parking lot.
13. Provide opportunities for wildlife observation and photography on newly acquired lands wherever those opportunities will least disturb migratory species. We will provide between three and six new trails if we acquire all 6,030 acres on the lower Delmarva Peninsula. There will be at least one, but no more than two, trails on each the bayside, the southern tip, and the seaside of the Delmarva Peninsula. At least one trail on the bayside will have beach access, if it does not adversely affect tiger beetles.

### Objective D: Environmental Education

Focus 85 percent of the content of educational programs on the importance of the Eastern Shore of Virginia Refuge to forest and shrub-dependent neotropical and temperate migrants to promote awareness among Northampton County students and other program participants of the refuge's role in the conservation of migratory birds and their habitats.

**Refuge intern teaching a first grade class.**
*USFWS photo*

*Rationale for the Objective:* Environmental education is identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use. It also serves as a valuable tool in the protection of our nation's wildlife and habitat resources. Educating young people about wildlife conservation fosters an appreciation of the important role the refuge plays in support of these efforts and hopefully motivates individuals to make responsible environmental decisions in the future.

**Strategies:**

*1-5 years*

1. Develop three lesson plans focusing on neotropical and temperate migrants and following State Standards of Learning guidelines.
2. Conduct environmental education (EE) programs for Northampton County elementary school children (kindergarten through fifth-grade) and provide programs for other schools when possible.
3. Educate all third graders in Northampton County about migrating monarch butterflies and familiarize them with the "Monarch Watch" program and website.
4. Develop four interpretive programs for summer day camps from both the Eastern Shore and Hampton Roads areas that focus on the importance of the refuge to neotropical and temperate migrants.
5. Work with partners to develop and conduct one environmental education program per year that is taught in Spanish and aimed at educating the Eastern Shore's Hispanic population about local conservation issues, emphasizing the importance of the refuge to neotropical and temperate migrants.
6. Continue to offer the Junior Refuge Manager Program to interested youth, and develop an additional Junior Refuge Manager Program that targets fifth-to seventh-graders and emphasizes habitats important to neotropical and temperate migrants.
7. Continue to participate in the regional high school Envirothon.
8. Continue to conduct a seasonal woodcock educational programs when possible.

*6-10 years*

9. Annually conduct an on-site teacher workshop that focuses on fall migration, and do feedback questionnaires to help

refine programs to best meet teachers' needs. Develop workshops in conjunction with an accredited university so teachers can obtain continuing education units.

10. "Adopt" a class at Kiptopeke Elementary School. This will include developing a series of environmental education programs for a specific class throughout the school year that focuses on the refuge and its importance to neotropical and temperate migrants.
11. Work with local partners like The Nature Conservancy (TNC), Kiptopeke State Park and the Barrier Island Museum to support an annual Elderhostel program focusing on improving habitat for neotropical and temperate migrants.
12. Develop lesson plans on migration that can be used by teachers in the classroom.

*11-15 years*

13. Design and construct an outdoor environmental study area consisting of a half-mile trail, three teaching stations, and a pavilion to educate students from the Delmarva Peninsula and nearby areas on the importance of the refuge to neotropical and temperate migrants.
14. Renovate a building to include a wet lab, indoor classrooms, hands-on exhibits, and teacher resource library.

### Objective E: Wildlife Interpretation

**The whale skull and the touch table exibit at the refuge visitor center.**
*USFWS photo*

Promote awareness among refuge visitors and residents of the lower Delmarva Peninsula regarding the refuge's role in the conservation of migratory birds and their habitats. Focus 85 percent of interpretive materials, signs, and exhibits on the importance of the Eastern Shore of Virginia Refuge to forest and shrub-dependent neotropical and temperate migrants.

*Rationale for the Objective:* Providing the public with a wide variety of interpretive information about neotropical and temperate migrants will greatly increase public understanding and support for habitat protection efforts on the southern tip of the Delmarva Peninsula. Additionally, wildlife interpretation is identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use.

#### Strategies:

*1-5 years*

1. Continue to offer visitors a modern, interactive, and educational Visitor's Center with video presentations, various exhibits, talks, and programs to enhance their Refuge experience.
2. Create a diorama for the Visitor Center that depicts the important neotropical and temperate migrant habitats on the lower eastern shore and the species associated with them.
3. Revise refuge brochure and website to focus more attention on the importance of the refuge to neotropical and temperate migrants.

4. Develop two permanent interpretive displays for the wildlife trail kiosk that focus on the refuge as a staging area for neotropical and temperate migrants.
5. Continue to provide 1.5 miles of trails with a kiosk and interpretive signs.
6. Continue to conduct special tours and programs on request (e.g. Scouts, birding clubs, garden clubs).
7. Continue to coordinate with the Chesapeake Bay Bridge Tunnel (Bridge-Tunnel) Authority to display interpretive material on the bridge.
8. Develop a portable/traveling exhibit that emphasizes the importance of the refuge to neotropical and temperate migrants. The exhibit will be used for off-refuge festivals, events and public meetings.
9. Work with partners (e.g. Coastal Virginia Wildlife Observatory) to enhance and expand, from March to May, interpretive migratory bird programs for the general public and students.
10. Install a camera at an active osprey nest platform and broadcast the image on a monitor at the Visitor Center. Place pictures from the camera on the refuge website.

**Northern saw-whet owl.**
*Fran Saenz*

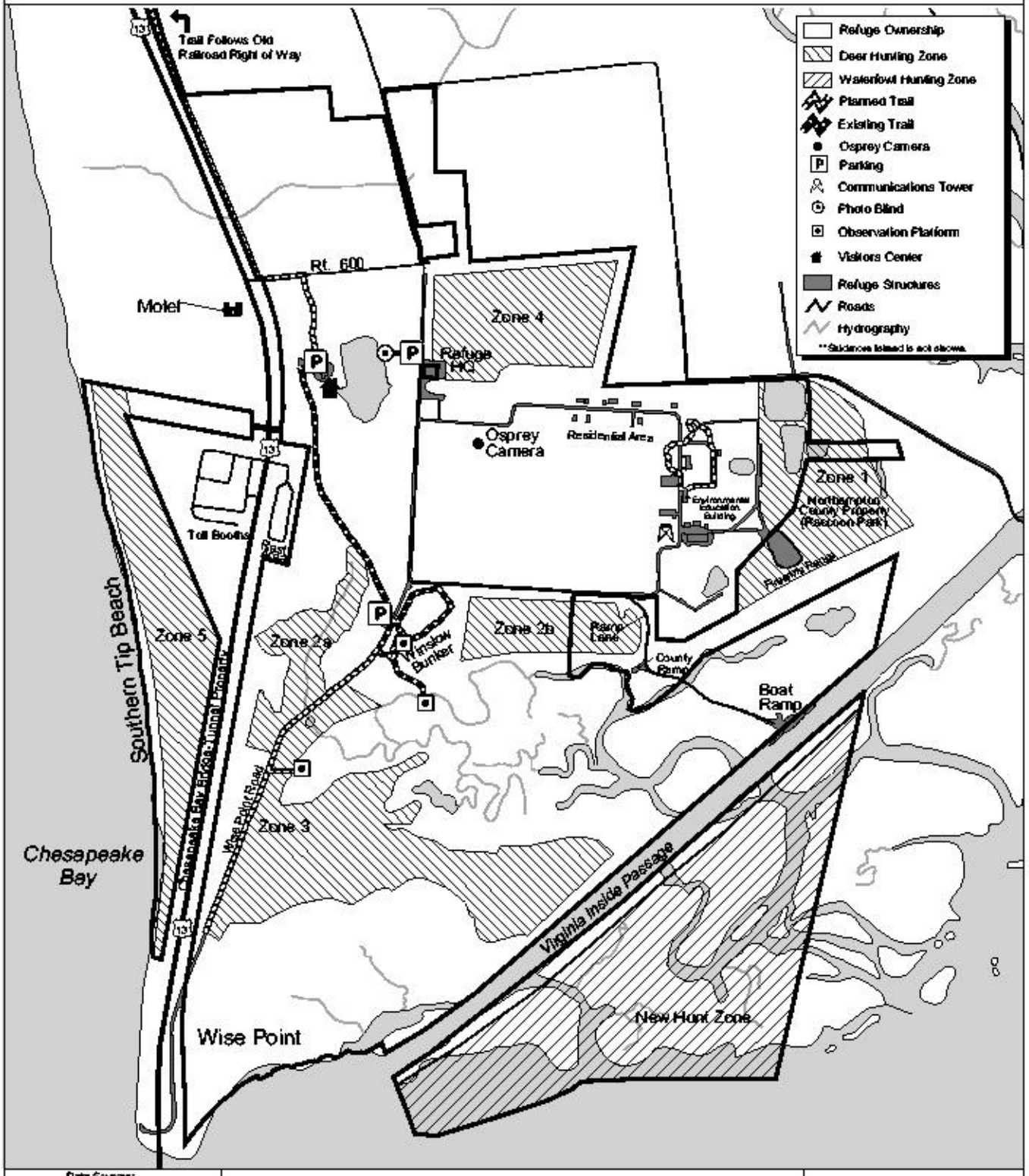
*6-10 years*

11. Design interpretive trail signs to address the importance of the refuge to neotropical and temperate migrants.
12. Conduct a monthly fall interpretive walk that focuses on neotropical and temperate migratory bird identification and habitat needs.
13. Conduct a monthly interpretive program (e.g., "owl hoots") in the late fall during evening hours that focuses on field identification of owls.

*11-15 years*

14. Produce an interpretive video that describes hardwood and understory management, with an emphasis on habitat management practices that benefit neotropical and temperate migrants. The video will become a part of the management video in the Visitor Center and can also be used in talks to the public.
15. Provide interpretive signs along trails on newly acquired property. Signs on bayside trails can interpret the importance of the beach to the Northeastern beach tiger beetle; signs on the southern tip can interpret the importance of the area to neotropical migrants; signs on the seaside can interpret the importance of the salt marsh to water birds.

# Public Use Opportunities
## *Eastern Shore of Virginia Refuge*




Data Sources:
1:24,000 Hydrography & 1:100,000 Road data provided by USGS with source dates of 1981 & 1989. All other data provided by USFWS. Projection/Datum: UTM Zone 18, NAD 27. Meters.
Map prepared for the Eastern Shore of Virginia NWR & Fisherman Island NWR Comprehensive Conservation Plan by the RS Cartography & Spatial Data Services Section. March 2003
This map is for planning purposes only.

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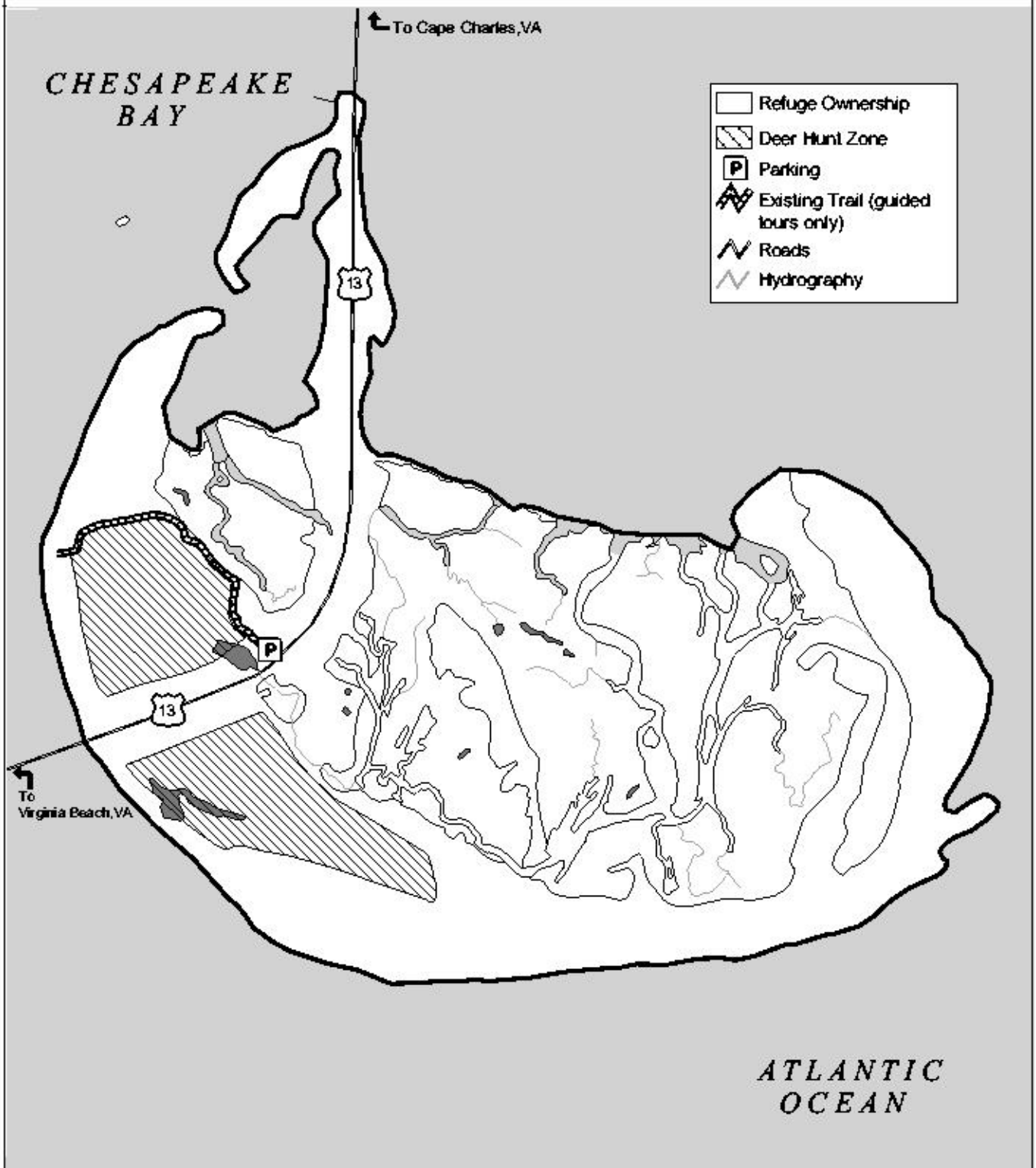
Map 2-3

# Public Use Opportunities
## *Fisherman Island Refuge*




Data Sources:
1:24,000 Hydrography & 1:100,000 Road data provided by USGS with source dates of 1981 & 1989. All other data provided by USFWS. Projection/Datum: UTM Zone 18, NAD 27, Meters.
Map prepared for the Eastern Shore of Virginia NWR & Fisherman Island NWR Comprehensive Conservation Plan by the R5 Cartography & Spatial Data Services Section. March 2003
This map is for planning purposes only.

0 1000 2000 3000 4000 Feet

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## GOAL 5: Integrate the refuges into the larger community of the eastern shore and promote awareness of the unique value of the lower Delmarva Peninsula to neotropical and temperate migratory birds and migrating monarch butterflies.

### Objective A: Encourage Responsible Nature–Based Tourism

Communicate to the local service industry (e.g., tourism guides; employees of hotels, bed and breakfasts, restaurants) the ecological importance of the Eastern Shore of Virginia and Fisherman Island Refuges and encourage the use of responsible resource stewardship practices to promote the lower Delmarva Peninsula as a nature-based tourism destination.

*Rationale for the Objective:* Working with partners to draw attention to the importance of the refuge and surrounding lands as critical stopover and staging habitat for neotropical and temperate migrants will generate a broad base of support for habitat conservation efforts in the lower Delmarva Peninsula. Tour guides will be taught how to minimize the impacts of their activities so that they can showcase the area's natural resources without adversely affecting wildlife or its habitats. Increased nature-based tourism will also provide additional recreational opportunities for visitors and economic benefits to the local community.

**Eastern Shore of Virginia Birding Festival.**
*Chamber of Commerce website*

Strategies:

*1-5 years*

1. Co-sponsor and participate in local festivals and events to promote nature-based tourism on the lower Eastern Shore. Major events include Eastern Shore of Virginia Birding Festival, International Migratory Bird Day, National Wildlife Refuge Week, National Hunting and Fishing Day, Earth Day, Chesapeake Bay Bridge Tunnel Walk/Bike Day, and Citizens for a Better Eastern Shore Biking Day.
2. Continue cooperative efforts with conservation groups to promote nature-based tourism in the area by, for example, helping to develop visitor guides such as the Delmarva Birding Guide and the Audubon Guide for Refuges.
3. Continue to educate tour guides on refuge regulations and the fragility of Fisherman Island Refuge's habitats and nesting colonies, especially as kayaking increases in popularity on the lower Delmarva Peninsula.
4. Support the Coastal Virginia Birding Trail by developing an interpretive site on the refuge and promoting other coastal sites on the refuge website.
5. Work with universities and agencies that are developing courses for commercial tour guides which focus on minimizing the environmental impacts of nature-based tourism. The Virginia Coastal Program, through its Seaside Heritage Program, is offering an Ecotour Guide Certification Course, and is funding the Virginia Institute of

Marine Science to create a teacher certification course in 2004.

6. Under the Seaside Heritage Program, the Virginia Coastal Program is working to develop a Seaside Canoe/Kayak Water Trail. Work with these and other partners developing kayaking trails in the Eastern Shore area.

*6-10 years*

7. Establish closer relationships with the local business community to promote responsible nature-based tourism. This includes educating tour guides about the area's sensitive natural resources and encouraging responsible behavior around sensitive wildlife habitats and populations with emphasis on neotropical and temperate migrants.

*11-15 years*

8. Work with partners (e.g., Chamber of Commerce, Citizens for a Better Eastern Shore, bed and breakfasts, local restaurants) to develop nature-based tourism "packages" (lodging, transportation, meals) that highlight refuge resources through organized tours and workshops.
9. Work with the Bridge-Tunnel Authority to develop and install four new interpretive signs on the bridge islands, overlook, and rest areas. The signs will focus on neotropical and temperate migrants.
10. Develop a three-mile bike trail with two interpretive panels that focus on the importance of the lower Delmarva Peninsula to neotropical and temperate migrants.

### Objective B: Increase Refuge Recognition and Support

Increase efforts to build recognition and support for the refuge by improving communication with local and national constituents and the interested public (e.g., Congress, conservation organizations, local communities, news media, and corporations).

*Rationale for the objective:* Fostering relationships with community leaders, local politicians, and the news media will strengthen support for the refuge and its programs. Special events improve community relations and awareness, as well as provide benefits to the local economy. Volunteer efforts and establishment of a Friends Group will help broaden refuge support in neighboring communities.

#### Strategies:

*1-5 years*

1. Offer outreach programs to civic groups such as local Garden Clubs, senior citizen groups, and Rotary Clubs.
2. Serve as an advisor for the Coastal Virginia Wildlife Observatory (CVWO), a non-profit environmental organization that contributes to migratory bird and butterfly research conducted on the lower eastern shore.
3. Maintain cooperative management efforts with Kiptopeke State Park, resulting in contributions to our respective

**Scarlet tanager.**
*USFWS photo*

long-term management plans.

4. Continue to share refuge facilities (e.g., conference building) with Federal, State, and local agencies such as the Cape Charles Town Council, Kiptopeke State Park, Natural Resource Conservation Service, and the County Sheriff's Department to promote interagency coordination.
5. Maintain the refuge website to promote interest in the refuge. Information for visitors, volunteers, interns, and Workampers is available with such listings as a special event calendar, featured species of the month, rare sightings, historical information, and more.
6. Institute an annual field workshop for government and non-government partners that focuses on wildlife management issues on the refuge, with emphasis on forest and shrub-dependent neotropical and temperate migrants.
7. In cooperation with partners (e.g., Northampton County Chamber of Commerce, State agencies, and private landowners), continue planning International Migratory Bird Day activities on the refuge and work together on other special events (e.g., Birding Festival).
8. Form a refuge Friends Group to work both on and off the refuge. Off-refuge work will focus on developing partnerships in the local community and educating local landowners about Service land protection programs. Refuge staff will partner with the National Wildlife Refuge Association to train, mentor, support, and expand this new Friends Group.
9. Meet with Congressional representatives at least annually to provide an update on refuge operations and programs.
10. Increase efforts to invite television, newspaper, radio, and other media to major refuge events throughout the year (e.g., International Migratory Bird Day, Birding Festival, National Wildlife Refuge Week, etc.).

*6-10 years*

11. Work cooperatively with the Audubon "Refuge Keepers" program and/or other local environmental organizations to establish a vibrant volunteer corps to promote community stewardship of the refuge and increase public understanding of local conservation issues. This new group will also assist with expansion of corporate partnerships to increase financial support of refuge programs.
12. Conduct a tour of the refuge during the fall Harvest Festival that emphasizes the importance of the eastern shore to neotropical and temperate migrants.
13. Provide refuge information to participants of the Virginia State Fair and similar events emphasizing the important role the refuge serves for neotropical and temperate migrants.
14. In conjunction with partners, expand corporate sponsorship of refuge-related events such as International Migratory Bird Day, National Wildlife Refuge Week, and National Fishing Week.

### Objective C: Deliver a Conservation Message

Deliver a conservation message to those involved in land use and development. The message will emphasize practices beneficial to forest and shrub-dependent neotropical and temperate migrants.

*Rationale for the Objective:* This objective is aimed at raising the ecological awareness of those individuals actively involved in local land use and development such as building contractors, agricultural extension agents, and local nurseries. It will also encourage landowners to improve the habitat value of their property for neotropical and temperate migrants. Successful achievement of the objective will foster a broader base of support for the refuge and resource conservation efforts on the lower Delmarva Peninsula.

#### Strategies:

*1-5 years*

1. Work with cooperating organizations (e.g., local nurseries, garden clubs, agricultural extension office) to educate landowners on how to improve the value of their property as habitat for neotropical and temperate migrants.

*6-10 years*

2. Develop a demonstration plot on the refuge to educate homeowners about landscape practices that benefit neotropical and temperate migrants.
3. Coordinate with a local garden club to highlight "wildlife friendly" landscape practices on one to three homes in the County, focusing on the benefits to neotropical and temperate migrants.

*11-15 years*

4. Develop a program to certify building contractors as "wildlife friendly" in their practices so contractors can market this attribute to potential customers.
5. Work with the National Wildlife Federation to promote its backyard wildlife habitat program that educates homeowners about "wildlife friendly" land use practices they can undertake on their property.
6. Develop and promote, in conjunction with the local Chamber of Commerce, a garden tour focusing on fall nectar-producing flowers and stressing the important role the eastern shore plays for migrating monarch butterflies.
7. Develop a brochure for local residents regarding the importance, care, and maintenance of landscaping with native nectar-producing plants.
8. Work with private landowners to create five demonstration gardens in Northampton County to teach local residents first-hand how to develop their own butterfly gardens using native nectar-producing plants.

### Objective D: Assess Economic Impact of Nature-Based Tourism

To foster support for the refuge and its programs in nearby communities, deliver a positive message to area businesses and residents of Northampton County regarding the impact that the refuge and its visitors have on the local economy.

*Rationale for the Objective:* Community leaders, business owners, and local residents will better understand how the refuge and nature-based tourism benefit the local economy and help maintain the quality of life in Northampton County.

#### Strategies:

*6-10 years*

1. In partnership with the local community, assess the economic benefits of the migratory bird resource to Northampton County.
2. Using the publication *Banking on Nature* and similar resources, promote to the local community the economic contribution of the refuge to Northampton County.

## Goal 6: Enhance and restore the quality of the soils, waters, and other abiotic components of the refuge landscape.

### Objective A: Contaminants

Determine the extent of contamination, if any, on existing refuge lands known or suspected to be contaminated, and the effects of that contamination on wildlife and plants. In addtion, survey any lands to be acquired for potential contaminants.

*Rationale for the Objective:* A 1998 report (U.S. Environmental Protection Agency) was prepared to document levels of contaminants in ground water, surface water, soils, and sediments on the Eastern Shore of Virginia Refuge. However, sampling was limited in design and results indicate that at several locations organochlorine (pesticide) contamination may be impacting plants and animals. Since the extent of contamination is not adequately described by the sampling conducted for the 1998 report and the results are not adequate to evaluate the risk to plants and animals, the Service recommends more thorough sampling.

#### Strategies:

*1-5 years*

1. Interview former military personnel to identify sites of possible contamination.
2. Conduct contaminant surveys on existing refuge properties and on properties identified for acquisition.
3. Remove underground storage tanks and inspect above-ground storage tanks. Follow precautionary measures such as spill prevention and adequate containment.

4. Correctly store and/or dispose of hazardous materials such as flammables and pesticides. Inspect structures for asbestos.
5. For heavy metals and organochlorine pesticides, work with Northampton County to conduct thorough sampling of sediments and surface waters of the firearms range and the wetlands beyond it, Raccoon Creek and its drainages, and groundwater flow from the former landfill and sewage lagoons.
6. Work with the Service's Virginia Field Office to establish and implement the baseline biological sampling that was recommended in the Contaminant Assessment Process (CAP) for Eastern Shore of Virginia (1999) and Fisherman Island (2000) NWRs.

**County firearms range.**
*Susan Rice*

### Objective B: Firearms Range

While operating the firearms range in the best interest of the refuge and law enforcement user groups, work with Northampton County to monitor impacts of spent ammunition on wildlife habitat.

*Rationale for the Objective:* Although the firearms range has safety berms on three sides, it is not lined to prevent leachate from percolating the soil or assisting in future contaminant isolation and cleanup. All actions will include close cooperation with Northampton County (the land owner).

#### Strategies:

*1-5 years*

1. Continue to work with partners (e.g., Northampton County, local law enforcement agencies) to find an alternate site for the firearms range (off-refuge) in a less environmentally sensitive location. Consider acquiring the land now occupied by the firearms range, land which lies within the original acquisition boundary.
2. Continue to administer and maintain the firearms range. Restrict use to law enforcement personnel from Northampton and Accomack counties. Schedule usage so as not to conflict with environmental education programs.
3. Continue to collect and recycle spent brass casings.
4. Conduct media sampling beyond the firearms range berm to evaluate ecological risk to biotic elements.
5. Design and implement engineering mechanisms to control surface runoff and leachate.
6. Implement current practices for firearms range management such as periodic removal of contaminated soils.

### Objective C: Contingency Planning for Oil and Hazardous Material Spills

Assist with protecting the environmental quality of the lower Delmarva Peninsula by serving as an active participant in contingency planning and response to oil and hazardous material

spills in the Atlantic Ocean and Chesapeake Bay.

*Rationale for the Objective:* Due to geographic location, the southern Delmarva Peninsula and its surrounding salt marshes are especially vulnerable to threats from oil and hazardous material spills. Time and planning are critical factors for mitigating spill impacts on the Eastern Shore of Virginia and Fisherman Island Refuges.

*1-5 years*

1. Annually update spill and pollution prevention plans.
2. Maintain close communication and coordination with the Bridge-Tunnel Authority to achieve early spill notification.
3. Maintain close communication with the spill response coordinator at Chincoteague National Wildlife Refuge.
4. Provide the Bridge-Tunnel Authority with current sensitive area maps of both refuges and familiarize them with access points for deploying spill control equipment.
5. Encourage the Bridge-Tunnel Authority's participation in the Mid-Atlantic Coastal Area Planning Committee for spill response, control, and prevention purposes.
6. Provide spill response training for refuge staff.
7. Ensure that staff are familiar with the Service's spill response chain of command in Virginia and on the Delmarva Peninsula.

*6-10 years*

8. With the Service's Field Response Coordinator, explore with the U.S. Coast Guard and the Mid-Atlantic Coastal Area Planning Committee the idea of conducting a mock spill drill in the area of the southern Delmarva Peninsula.

**Communications tower.**
*Susan Rice*

### Objective D: Artificial Structures

Promote a more natural appearance to refuge landscapes and increase the amount of acreage available as wildlife habitat by removing unnecessary artificial structures that obstruct views, occupy space, and in some cases constitute direct hazards to wildlife.

*Rationale for the Objective:* Artificial structures are often considered merely aesthetic or visual problems. There are, however, many ecological reasons for their removal. Communications towers are known hazards to birds. Unoccupied buildings become shelters for rats and raccoons and other predators. Roadways create ecological edge communities that concentrate a diversity of plant species, many of which are invasive. Artificial impoundments create aquatic systems that alter natural biodiversity. Furthermore, the cumulative space occupied by such structures is considerable, and cuts down on available wildlife habitat. Structures that require maintenance from non-refuge staff are best located on the perimeter of the refuge to assist in the

operation of the site and to enhance the security of refuge facilities.

Strategies:
*1-5 years*

1. Remove the old water tower in the maintenance area, taking precautions regarding the presence of lead-based paint.
2. Verizon Virginia, Inc. will remove the communications tower once the lease on that structure expires in 2007. We will work with Verizon to remove or relocate the switching station.
3. We will coordinate with the appropriate authorities to ensure that Formerly Used Defense Sites (FUDS) are secure and do not pose a safety hazard before we allow unrestricted access in their vicinity.

**American oystercatcher.**
*AJ Hand*

## General Refuge Management

### Baseline Inventories

The need for baseline information on National Wildlife Refuges has become urgent as more and more species are lost to extinction (Defenders of Wildlife 1998). Without the knowledge of the status, trends, and responses to management of biological systems, refuges cannot be effectively managed for the conservation of fish, wildlife, and plants. The development of systematic species and habitat monitoring is recommended in the "Fulfilling the Promises" document (USFWS 1999a) which lays out a vision for the National Wildlife Refuge System. Standardized Region 5 surveys call for conducting annual surveys for breeding birds, grassland birds, marsh birds, frogs and toads. In addition to the standardized Region 5 surveys, we will use peer-reviewed protocols to collect baseline and trend data on vascular plants, vertebrates, invertebrates, threatened and endangered species, and trust resources on the Eastern Shore of Virginia (including Skidmore Island) and Fisherman Island Refuges.

### Protecting and Managing Cultural Resources

By law we must consider the effects of our actions on archeological and historic resources. We will comply with Section 106 of the National Historic Preservation Act, which requires that "earth moving" projects (projects that require breaking ground) be reviewed for archeological resources prior to commencement. Compliance may require a State Historic Preservation Records survey, literature survey, or field survey.

The Service will consult with the Virginia Department of Historic Resources (Virginia's State Historic Preservation Office) in evaluating the National Register eligibility of farmstead buildings and associated historic and archaelogical sites. Management

alternatives for the buildings will be developed after their eligibility has been determined. Options include documenting and demolishing them, moving them for reuse by another organization, or rehabilitating and adaptively reusing them for refuge or partner purposes. The refuge will also initiate a structural engineering review of the Winslow Bunker (Battery 12) on Eastern Shore of Virginia Refuge and install a more effective gate system at that site.

In 2000, the refuge's museum property intern and Outdoor Recreation Planner drafted revisions to the refuge's Scope of Collection Statement. This document is intended to guide the refuge in the future acquisition and management of appropriate museum property. The refuge will review and adopt a version of this draft as its current Scope of Collection Statement. In addition, the refuge will continue to implement report recommendations about improving the environment of the Environmental Education Building or creating an alternative modular storage area for the collection. Other actions to be taken with museum property are:

- Appraise the refuge's decoys and historic objects.
- Address any pest infestation of the refuge's mounted specimens and decoys.
- Clean mounted zoological specimens.
- Maintain the refuge's scientifically valuable wet specimens.
- Prepare and implement housekeeping, pest management, and environmental monitoring plans.
- Catalog and label remaining uncataloged documents and historic objects.
- Inspect archaeological artifacts belonging to the refuge but located at the Virginia Department of Historic Resources.

### Wilderness Review

The final refuge planning policy published May 25, 2000 requires that a wilderness review be conducted concurrently with the CCP process. However, since this CCP was in preparation prior to the finalization of the planning policy, a wilderness review has not yet been completed. A site visit to assess wilderness characteristics of both refuges was accomplished in 1999. When examining Fisherman Island Refuge, we discussed the need to further evaluate the impacts caused by artificial structures, such as the major four-lane highway–U.S. Route 13. This highway cuts through the northwestern part of Fisherman Island, causing noise, habitat fragmentation, and visually impacting the entire island. The highway travels along the surface of the island for about 1.6 miles and is raised on bridge abuttments above the island for another 0.2 mile. A small unimproved road also exists on the island, allowing access by refuge staff and researchers. We did not complete our review and concluded that a more in-depth study is needed. Therefore, we will complete a wilderness review for Eastern Shore of Virginia, including Skidmore Island, and Fisherman Island within three years of approval of this CCP.

We will also evaluate Fisherman Island and Skidmore Island for their Research Natural Area potential within three years of final CCP approval.

### Refuge Revenue Sharing Payments

Annual Refuge Revenue Sharing payments to Northampton County, Virginia will continue. Future increases in payments will be commensurate with increases in the appraised fair market value of refuge lands, new acquisitions of land, and new Congressional appropriations.

**Interns banding a tern.**
*USFWS photo*

### Volunteer and Internship Opportunities

The refuge will continue to offer the Workamper and Internship programs. These programs provide education to participants as well as much-needed administrative, public use, maintenance and biological help to the refuge.

### Research

We will encourage and support research and management studies on refuge lands that will improve and strengthen natural resource management decisions. Specifically, we will encourage and seek research relative to approved refuge objectives that clearly improves land management and promotes adaptive management. Priority research addresses information that will help us to better manage the nation's biological resources, that addresses important management issues, or that demonstrates techniques for management of species and habitats to: agencies of the Department of Interior, the U.S. Fish and Wildlife Service, the National Wildlife Refuge System, and State Fish and Game agencies.

We will also consider research for other purposes that may not be directly related to refuge-specific objectives, but contributes to the broader enhancement, protection, use, preservation, and management of native populations of fish, wildlife, and plants, and their natural diversity within the region or flyway. These proposals must pass the Service's compatibility policy.

We will maintain a list of research needs that will be provided to prospective researchers or organizations upon request. Refuge support of research directly related to refuge objectives may take the form of funding, in-kind services such as housing or use of other facilities, direct staff assistance with the project in the form of data collection, provision of historical records, use of management treatments, or other assistance as appropriate.

All researchers will be required to submit a detailed research proposal following Service Policy (FWS Refuge Manual Chapter 4 Section 6). In general, the refuge must be given at least 45 days to review most proposals before initiation of research and 60 days to

enjoyment of refuge values. The erratic changes in engine pitch, the pulsation of sound produced by jumping wakes, and frequent changes in speed, in addition to the volume of sound, create a noise that is perceived as both an irritation and an intrusion on the refuge experience.

### Monitoring, Evaluation, and Adaptive Management

The Final CCP will cover a 15-year period. Periodic review of the CCP will be required to ensure that established goals and objectives are being met and that the plan is being implemented as scheduled. In many cases, monitoring is built into the strategies of the CCP.

We will monitor public use programs by continuing to collect and compile visitation figures and activity levels. In addition, we will establish research and monitoring programs to assess the impacts of public use activities on wildlife and wildlife habitat and to identify compatible levels of public use activities. We will reduce these activities if we determine that incompatible levels of public use are occurring.

Records of wildlife species using the refuges, their habitat requirements, and their seasonal use patterns will be updated regularly through collection of baseline data on all wildlife populations and habitats. The baseline inventories called for in General Refuge Management will annually survey breeding birds, grassland birds, marsh birds, frogs and toads, as well as collect data on vascular plants, vertebrates, invertebrates, threatened and endangered species, and trust resources on the Eastern Shore of Virginia and Fisherman Island Refuges.

**Southern leopard frog.**
*USFWS photo*

In addition, the Species Inventory and Monitoring Plan, a step-down management plan to be initiated in 2006, will increase ability to monitor the refuges' biological resources by providing specific guidance for the systematic accounting of temporal and spatial trends in the abundance and diversity of species. Inventories will obtain, at a minimum, information on the abundance and distribution of vascular plants, vertebrates, and Federally endangered and threatened species. Monitoring efforts will target carefully chosen species in an effort to convey information about the status of the larger ecological system and the integrity of specific habitats or ecosystem processes. Rigorous and quantitative monitoring will be oriented toward management decisions to ensure scientifically-based management with proper feedback for adaptive management decisions.

Many of the strategies delineated in this chapter call for the monitoring and evaluation of the goal to which they refer. Extensive monitoring plans to measure understory response to thinning, the effects of deer on browse species and forage availability for neotropical migrants, prevalence of invasive species, changes in sand accretion and erosion, human and predator

disturbance, nesting site productivity, and presence of Federal listed species as well as a host of other biological resources are called for in the strategies of the plan. This extensive monitoring will enable us to evaluate refuge habitat management programs for positive and negative impacts on wildlife habitat and populations and to determine if these management activities are helping to meet refuge goals and objectives. Information obtained from monitoring will allow staff to set more specific and better management objectives, more rigorously evaluate management objectives, and, ultimately, make better management decisions.